

Willow Flycatcher (*Empidonax traillii*)

Legal Status

State: Endangered (willow flycatcher full species)

Federal: Endangered (southwestern willow flycatcher subspecies)

Critical Habitat: Designated on October 19, 2005 (70 FR 60886–61009) for southwestern willow flycatcher. The U.S. Fish and Wildlife Service (USFWS) proposed revised critical habitat on August 15, 2011 (76 FR 50542-50629), but the 2005 designation is still in place pending issuance of a final rule.

Recovery Planning: Final recovery plan (USFWS 2002) for southwestern willow flycatcher



Photo by Dudek.

Taxonomy

The willow flycatcher (*Empidonax traillii*) is a small passerine that was once considered along with the alder flycatcher (*E. alnorum*), as Traill's flycatcher (Grinnell and Miller 1944). Since 1973 the American Ornithological Union (AOU) has treated the alder flycatcher as a separate species and there are currently four recognized subspecies of *E. traillii*, three of which occur in California (*E. t. brewsteri*, *E. t. adastus*, and *E. t. extimus*) (USFWS 2002; Unitt 1987). Only the southwestern willow flycatcher subspecies (*E. t. extimus*) breeds in the Plan Area, and it is the primary focus of this account. The other two subspecies occur in the Plan Area only briefly during migration, and they are addressed in this account where relevant. The southwestern willow flycatcher was described by A. R. Phillips in 1948 from a collection by G. Monson from the lower San Pedro River in southwestern Arizona (60 FR 10695–10715). Southwestern willow flycatcher can be phenotypically distinguished from the other subspecies by its paler color, wing ratio, and song dialect (60 FR 10695–10715), although these are not reliable field identification

criteria (Sogge, pers. comm. 2012). Paxton (2000) concluded that the *E. t. extimus* subspecies is genetically distinct from the other subspecies, although intergrades between *E. t. adastus* and *E. t. extimus* have been reported (Unitt 1987).

Distribution

General

The willow flycatcher occurs throughout the United States with the exception of the extreme northeast and the southeast. In California, breeding populations of *E. t. adastus* and *E. t. brewsteri* are separated by the crest of the Sierra Nevada, while the historical range of *E. t. extimus* includes riparian habitats in the southern one-third of California, southern Nevada, Arizona, New Mexico, western Texas and northern Mexico (Sogge et al. 2010; USFWS 2002; Figure SP-B13), and, again, this is the only subspecies breeding in the Plan Area. The current range of *E. t. extimus* is similar to its historical range, the main difference being a reduction in the distribution and amount of existing suitable habitat within its historical range. This subspecies' breeding range extends as far north as the Santa Ynez River, Kern River, and the town of Independence on the Owens River (Craig and Williams 1998). Outside of California, historical breeding has occurred in southern Nevada, southern Utah, Arizona, New Mexico, and southwestern Colorado (Paxton 2000; Sogge et al. 2010).

Distribution and Occurrences within the Plan Area

Historical

Within the Plan Area, breeding southwestern willow flycatchers have been found at five general locations: Owens River Valley, Mojave River, San Felipe Creek (a tributary of the Salton Sea), the Lower Colorado River between Hoover and Parker, and the Lower Colorado River between Parker and the international boundary (Durst et al. 2008a). Willow flycatcher populations at these locations still exist, although numbers of territories have greatly declined at some locations, especially along the Colorado River (Durst et al. 2008a). These sites are discussed in further detail in the following section.

There are no known general locations in the Plan Area that previously supported, but no longer support, southwestern willow flycatchers.

There are four historical (i.e., pre-1990) occurrences for southwestern willow flycatcher recorded in the Plan Area (CDFW 2013; Dudek 2013). The southwestern willow flycatcher occurrences are located north of Independence in Inyo County and in the vicinity of Mojave and California cities (Figure SP-B13).

Recent

As mentioned previously, there are five general locations in the Plan Area that currently support breeding populations of southwestern willow flycatchers. However, the southwestern willow flycatcher exhibits metapopulation dynamics with individuals commonly moving both among different sites within a breeding area and among different breeding areas (Sogge et al. 2010). Such movements reflect the dynamic interaction of suitable habitat and selection of breeding sites. In particular, small breeding sites are subject to variable use (Sogge, pers. comm, 2012). A detailed discussion of each of the five general breeding locations follows.

Owens River Valley: Most recently (as of 2007), Durst et al. (2008a) identified 28 territories at five sites in the Owens River Valley. However, almost all these territories occur north of the Plan Area. Within the Plan Area, two territories were located along the Owens River near Lone Pine in 1999, but the current breeding status at this location is unknown. Rourke et al. (2004) surveyed Hogback Creek near Lone Pine in 2001, but found no southwestern willow flycatchers. It is possible that none of the extant southwestern willow flycatcher territories found in the Owens River Valley occur within the Plan Area.

Mojave River: Durst et al. (2008a) stated that as of 2007, four nesting territories occur along the Mojave River near Victorville, but that territories are now gone from at least three other sites (Oro Grande, Upper Narrows, and Victorville Interstate 15). Nearby Holcomb Creek also once supported nest territories.

San Felipe Creek: San Felipe Creek is a tributary of the Salton Sea and as of 2007 supported four southwestern willow flycatcher nesting territories (Durst et al. 2008a).

Lower Colorado River – Hoover to Parker: As of 2007, Durst et al. (2008a) identified 14 territories remaining at six sites along this stretch of the Colorado River. However, most of these territories occur at Topock Marsh on the Arizona side of the border. A California territory at Trampas Wash is considered extirpated (Durst et al. 2008a).

Lower Colorado River – Parker to South International Border: At one time, breeding southwestern willow flycatchers were located at 16 sites along this stretch of the Lower Colorado River, mostly on the Cibola and Imperial National Wildlife Refuges (NRWs). By 2007, the number of territories was reduced to one. McLeod and Koronkiewicz (2009) resurveyed this stretch in 2008 and “rediscovered” some territories (e.g., at Big Hole Slough), but territory numbers remain very low.

There are 101 recent (i.e., since 1990) occurrence records for willow flycatcher, of which the vast majority are identified only as willow flycatcher (CDFW 2013; Dudek 2013). There are five recent records for southwestern willow flycatcher along the Lower Colorado River in the stretch between the Cibola and Imperial NWRs, just south of where Interstate 10 crosses the river, and in the Havasu NWR area. There are also recent occurrences for southwestern willow flycatcher north of Niland east of the Salton Sea, in the Mojave River Narrows Regional Park, and in a tributary to the Owens River just above Tinemaha Reservoir. The remaining recent willow flycatcher occurrences are located in several regions of the Plan Area, including: Ridgecrest and the China Lake Naval Air Weapons Station, Amargosa Canyon, the Fremont Valley in the western Mojave, the southern Sierra Foothills west of Red Rock Canyon State Park, the Cities of Mojave and California City, Galileo Park north of 20 Mule Team Parkway, the southwestern portion of Edwards Air Force Base, the western portion of Mojave National Preserve, the Kingston Range, the Morongo Valley, Lake Tamarisk Golf Course in the Chuckwalla Valley, and north of Niland east of the Salton Sea.

Natural History

Habitat Requirements

In California, the southwestern willow flycatcher is restricted to riparian habitats occurring along streams or in meadows (Craig and Williams 1998; Sogge et al. 2010). As noted above under Distribution and Occurrences, there is a dynamic relationship between suitable habitat and selection of breeding sites, with individuals commonly moving within general breeding areas and among different breeding areas. The structure of suitable breeding habitat typically consists of a dense mid-story and understory and can also include a dense canopy (60 FR 10695–10715). However, suitable vegetation is not uniformly dense and typically includes interspersed patches of open habitat. Typical plant species associated with their habitat include willow (*Salix* spp.), mulefat (*Baccharis salicifolia*), stinging nettle (*Urtica* spp.), cottonwood (*Populus* spp.), tamarisk (*Tamarix* spp.), and Russian olive (*Elaeagnus angustifolia*). Within the habitat structure parameters discussed above, southwestern willow flycatcher does demonstrate adaptability in that it can occupy riparian habitats composed of native broadleaf species, a mix of native and exotic species, or monotypic stands of exotics (Sogge et al. 2010). This subspecies is known to nest in monotypic stands of Russian olive and tamarisk (60 FR 10695–10715). Furthermore, along the San Luis Rey River in San Diego County, southwestern willow flycatcher has nested in riparian habitat dominated by coast live oak (*Quercus agrifolia*), and in Cliff-Gila Valley in New Mexico they are known to nest in tall box-elder. Plant species composition does not seem as important as a dense twig structure and an abundance of live, green foliage (Sogge et al. 2010). Also, the location of the nest seems to depend more on suitable twig structure and live vegetative cover than height or plant species composition (Sogge et al. 2010).

Riparian habitats within the Plan Area are also important stopovers to *E. t. adastus* and *E. t. brewsteri* as they migrate through (Finch and Kelley 1999). However, during migration willow flycatchers also use non-riparian habitats, including shrublands, grasslands, and agriculture (Finch et al. 2000). Other habitats used during migration typically lack

the features associated with breeding sites, such as standing water, moist soils, and patch size and structure (Finch et al. 2000).

Southwestern willow flycatcher nesting sites are generally located near surface water or saturated soils (Table 1). Due to the variability of hydrologic conditions in Southern California, water availability at a site may range from inundated to dry from year to year or within the breeding season. Nonetheless, moisture levels must remain high enough to support appropriate riparian vegetation (Sogge et al. 2010). Dense willow thickets are the most important habitat component for breeding *E. t. adastus* and *E. t. brewsteri* in California (Stefani et al. 2001).

Table 1. Habitat Associations for Southwestern Willow Flycatcher

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Supporting Information
Dense Riparian	Breeding	Primary	Dense understory and mid-story	60 FR 10695–10715
Riparian	Foraging	Secondary	Openings within and edges of breeding habitat, over wet areas	Finch and Stoleson 2000

Foraging Requirements

Southwestern willow flycatchers are insectivorous and forage at the edges or internal openings of their territory, above the canopy or over open water. There are records of adults foraging outside of their territory and even within neighboring territories (Finch and Stoleson 2000). Their diet consists mainly of bees, wasps, flies, leaf hoppers, and beetles (Durst et al. 2008b), which they catch in the air, glean from vegetation, or occasionally pick, catch, or seize from the ground (Sedgwick 2000). However, because southwestern willow flycatcher is a generalist, its specific diet is difficult to describe. Diets can vary depending on the breeding site and weather conditions (Durst et al. 2008b). Presumably, the diet of migrating *E. t. adastus* and *E. t. brewsteri* is similar.

Reproduction

Southwestern willow flycatcher males and females become reproductively viable during their second year. This subspecies is predominantly monogamous although reports of polygyny are not uncommon (Sedgwick 2000). Males arrive at the breeding sites between early May and early June (USFWS 2002; Table 2). Females arrive 1 to 2 weeks after males and inhabit the territory of a male (Finch and Stoleson 2000). Nest building begins approximately 2 weeks after pair formation. Females build an open cup nest measuring 8 centimeters high by 8 centimeters wide (3.1 by 3.1 inches) with little to no assistance from the male.

The female incubates the eggs for an average of 12 to 13 days. The female provides the majority of care for the young; however, the male becomes more involved as the nestlings grow and demand more food. The nestlings fledge between 12 and 15 days after hatching (Sogge et al. 2010).

Southwestern willow flycatcher will typically renest following an unsuccessful attempt and less frequently may renest following a successful attempt. The clutch size of the first nesting attempt is typically three to four eggs but decreases with each new attempt (Ellis et al. 2008).

Studies in California along the South Fork Kern River showed that site fidelity for banded adults was 35.8% (Craig and Williams 1998); however, these studies did not differentiate between site fidelity and mortality. Studies in Arizona that only included surviving adults showed site fidelity as high as 66% as opposed to less than 50% for studies in the same area that did not take mortality into consideration (Luff et al. 2000). As *E. t. adastus* and *E. t. brewsteri* do not breed in the Plan Area, they are not addressed in this section.

Table 2. Key Seasonal Periods for Southwestern Willow Flycatcher

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Arrival					X	X						
Breeding					X	X						
Fledges						X	X					
Migration South								X	X			

Sources: 60 FR 10695–10715; USFWS 2002

Spatial Behavior

During their northbound and southbound migrations, other subspecies of willow flycatcher pass through areas occupied by nesting southwestern willow flycatchers. In Southern California, peak numbers of northbound *E. t. brewsteri* migrate the first couple weeks of June through occupied *E. t. extimus* breeding territories (Finch and Stoleson 2000). Therefore, for the purpose of focused surveys for southwestern willow flycatcher, willow flycatchers occurring within the southwestern willow flycatcher breeding range can only be assumed to be southwestern willow flycatcher if detected between June 15 and July 20, when *E. t. brewsteri* have passed north to their breeding grounds (USFWS 2002). Willow flycatchers in the southwest migrate along riparian corridors (Finch and Stoleson 2000); because all three subspecies in California seasonally occur both north and south of the Plan Area, any riparian habitat within the Plan Area might represent important migration habitat for willow flycatchers. Finch and Kelley (1999) found that while migrating along the Rio Grande, willow flycatchers (including *E. t. extimus*) preferred habitats dominated by willows over other riparian species.

In adult southwestern willow flycatchers, movement to different breeding sites from year to year is not an uncommon occurrence and may occur as a response to low reproductive success at a particular nesting site. Distances covered range from 0.1 to 214 kilometers (0.06 to 133 miles) (Table 3). Year to year dispersal among juvenile birds is higher than in adults because juveniles rarely return to their natal site (Paxton 2007). Movement between breeding sites within the same

breeding season typically occurs during pre- or post-breeding; although territory switching does occur, it makes up a small percentage of this type of movement (Paxton et al. 2007).

Territory sizes vary greatly depending on several factors, including but not limited to quality of habitat and population density. The observed range of territory sizes is about 0.1 to 2.3 hectares (0.3 to 5.7 acres), with most in the range of 0.2 to 0.5 hectares (0.5 to 1.2 acres) (USFWS 2002). Male territories tend to be larger before and after breeding. The area utilized within a territory tends to be smallest during incubation and when occupied by nestlings (Sogge et al. 2010).

Wintering locations for southwestern willow flycatcher are becoming better understood. Paxton et al. (2011a) combined information from mitochondrial DNA sequences and morphological characteristics from museum specimens collected for willow flycatchers from across their winter range and found that the Pacific lowlands of Costa Rica appear to be a key winter location for southwestern willow flycatcher, although Central American countries may also be important for the subspecies. Willow flycatchers will travel between 3,200 and 8,000 kilometers (2,000 and 5,000 miles) round-trip from their wintering sites to their breeding sites. During migration, willow flycatchers use a greater variety of habitats, including some with non-riparian vegetation (Finch and Stoleson 2000).

Table 3. Movement Distances for Southwestern Willow Flycatcher

Type	Distance/Area	Location of Study	Citation
Breeding Territory	0.1–<2.3 hectares	California	USFWS 2002
Dispersal	0.1–214 kilometers	Arizona	Paxton 2007
Migration	3,200–8,000 kilometers	Throughout range	Finch and Stoleson 2000

Ecological Relationships

As is common for passerine bird species, southwestern willow flycatcher juveniles, eggs, and (less often) adults, are preyed upon by other birds, mammals, and reptiles. Predation is often the main factor

responsible for nest failure (Sogge et al. 2010). In studies conducted along the lower Colorado River in 2003, depredation accounted for 57% of all documented nest failures (Koronkiewicz et al. 2004).

Brown-headed cowbirds (*Molothrus ater*), which are obligate brood parasites, parasitize the nests of several native passerine species, including southwestern willow flycatcher, and therefore also contribute to the overall nest failure for this subspecies. Female cowbirds lay their eggs in the nests of other bird species (host pair) at the expense of the reproductive success of the host pair (Finch and Stoleson 2000). Cowbirds have existed sympatrically with southwestern willow flycatcher throughout most of its range for hundreds of thousands of years. However, in Southern California, these two species have only co-occurred since 1900 (USFWS 2002). Nonetheless, the defense mechanisms used by southwestern willow flycatcher in Southern California in response to nest parasitism are similar to those used by willow flycatchers elsewhere, including nest abandonment (USFWS 2002) or burying the parasite egg in the nest floor (Finch and Stoleson 2000). Most southwestern willow flycatchers renest after abandoning their nest due to parasitism (USFWS 2002) and do not typically fledge flycatcher young from a parasitized nest (Sogge et al. 2010).

Despite evidence for parasitism, brown-headed cowbirds are not considered a primary threat to the success of the southwestern willow flycatcher (Sogge et al. 2010). This subspecies may be able to coexist with cowbirds as a stable population in the absence of other threats (USFWS 2002). Brown-headed cowbirds appear to be more of a threat at small, isolated nesting sites (Sogge et al. 2010). A study in coastal central California showed that individuals nesting in less-dense vegetation with a more open canopy are more likely to be parasitized (Finch and Stoleson 2000). Thus, high-quality, dense riparian habitat is valuable not only because it provides suitable habitat but also because it may reduce the ability for cowbirds to parasitize southwestern willow flycatcher nests.

There is no information on possible competition between migrating *E. t. adastus* and *E. t. brewsteri* and nesting *extimus* in the Plan Area, although it is possible that the groups compete briefly for the same food resources.

Population Status and Trends

Global: Declining (NatureServe 2011)

State: Critically Imperiled (NatureServe 2011)

Within Plan Area: Likely Declining

From the mid-1900s to the 1980s, populations of southwestern willow flycatcher declined rapidly (Unitt 1987). As of 2007, there were 1,299 known territories occurring within 288 breeding sites throughout the southwestern willow flycatcher's range. Of the 1,299 territories, 930 were surveyed in 2007 and the remaining 369 had been surveyed in 2006 or earlier (Durst et al. 2008a). Short-term studies on southwestern willow flycatcher have shown either a decline in population or no trend (Finch and Stoleson 2000). Within the Plan Area, significant declines have occurred along the Lower Colorado River, and occupied sites have declined in the Mojave River (Durst et al. 2008a). Overall, this subspecies is considered to be in decline (NatureServe 2011).

The majority of known territories and breeding sites occur in Arizona, New Mexico, and California. As of 2007, 96 breeding sites supporting approximately 172 territories have been documented in California, accounting for about 33% of all documented breeding sites in the subspecies' range and 13% of all documented nesting territories for that year (Durst et al. 2008a). Arizona and New Mexico currently account for the majority of the documented breeding sites (57%) and documented territories (75%) (Durst et al. 2008a). In California, the largest populations are along the South Fork Kern River, the Owens River, San Luis Rey River, and Santa Margarita River (USFWS 2002); a portion of the Owens River occurs within the Plan Area (but few, if any, actual territories now occur within the Plan Area).

The other two California subspecies of willow flycatcher, *E. t. adastus* and *E. t. brewsteri*, have also suffered severe declines and consequently are also listed as endangered by the State of California. Intense agricultural and flood control activities in the Central Valley virtually eliminated the riparian habitat used by *E. t. brewsteri* (Serena 1982), and both *E. t. adastus* and *E. t. brewsteri* meadow habitats in the Sierra Nevada have been impacted by grazing (Stefani et al. 2001).

Threats and Environmental Stressors

The primary threat to the southwestern willow flycatcher is loss, modification, and fragmentation of suitable riparian habitat (Sogge et al. 2010). In general, increased human populations and development have resulted in a decline of riparian habitat, a habitat type that is naturally rare, patchy, and dynamic in the Southwest due to the varying hydrologic conditions of the region. The specific primary causes for loss and modification of riparian habitats have been dams and reservoirs, water diversion and groundwater pumping, channelization, flood control, agriculture, recreation, and urbanization (Sogge et al. 2010).

Impacts on suitable riparian habitat and conversion of adjacent native upland habitat have also resulted in indirect effects that are detrimental to this subspecies. Brown-headed cowbirds, discussed in the Ecological Relationships section above, are typically associated with anthropogenic influences, such as agriculture (cattle grazing), recreation (camp grounds and golf courses), and urbanization (lawns) (USFWS 2002). Although cowbird parasitism is not considered to be a primary threat to southwestern willow flycatcher, combined with other threats and stressors such as habitat loss and degradation, cowbird parasitism could be a significant contributor to population decline (USFWS 2002).

In California, the invasion of tamarisk and giant reed (*Arundo donax*) in riparian habitats has also been facilitated by anthropogenic disturbances (USFWS 2002). Although southwestern willow flycatcher is known to nest in monotypic stands of tamarisk, tamarisk is highly flammable and thereby has been suggested to pose a threat to southwestern willow flycatcher habitat (USFWS 2002; Finch and Stoleson 2000). However, while some territories have been lost in the last 20 years due to tamarisk fires, tamarisk has also supported many nesting territories, which have produced many hundreds of fledged flycatchers, which maintain and augment the population (Sogge, pers. comm. 2012). Additionally, Paxton et al. (2011b) concluded that using biocontrols such as tamarisk beetle (*Diorhabda* spp.) to eradicate tamarisk may negatively affect birds that have restricted distributions and sensitivity to seasonal defoliation, such as southwestern willow flycatcher, both in the short term and long term. Potential long term

adverse and beneficial effects will be related to the rate regeneration and/or restoration of cottonwood and willow riparian habitats relative to the rate of loss of tamarisk. Therefore, for southwestern willow flycatcher, its relationship to tamarisk is more complex than tamarisk simply increasing fire risk (Sogge, pers. comm. 2012).

Giant reed forms large monotypic stands that are unsuitable for the subspecies (USFWS 2002) and are also subject to large fires. The risk of fire has also increased along streams where the flow of water has been reduced, due to dams or flood control, allowing for the accumulation of fuel in the understory (USFWS 2002).

Grazing, cowbirds, and water removal (Owens Valley) projects continue to be a threat to Sierra Nevada populations of *E. t. brewsteri* and *E. t. adastus* within their breeding range. Within the Plan Area, the same threats mentioned above for *E. t. extimus* would affect *E. t. brewsteri* and *E. t. adastus* where they impact riparian migration corridors.

Conservation and Management Activities

Survey, monitoring, and research efforts increased significantly after the southwestern willow flycatcher was federally listed as endangered in 1995 (60 FR 10695–10715). Since then, statewide surveys have been initiated in Arizona, New Mexico, and Utah. Breeding and migration ecology, demography, and habitat research has been conducted in Arizona, New Mexico, and California (e.g., Crag and Williams 1998; Durst et al. 2008a, 2008b; Ellis et al. 2008; Hinojosa-Huerta et al. 2004; Langridge and Sogge 1997; Luff et al. 2000; Paxton et al. 2007; Sogge et al. 2010; Sogge and Paxton 2000). Range-wide population genetics work also has been conducted since the mid-1990s (USFWS 2002). Throughout the Southwest, several private, local, state, and regional efforts have formed in order to protect riparian habitats, including Partners in Flight and the Sonoran Bird Conservation Plan (USFWS 2002).

The Plan Area overlaps with the western part of the Lower Colorado River Recovery Unit, and the Basin and Mojave Recovery Unit identified in the recovery plan for southwestern willow flycatcher (USFWS 2002). The recovery plan sets forth alternative recovery criteria for the subspecies for downlisting to threatened and

additional criteria for delisting (USFWS 2002). One recovery criterion (Criterion A) for downlisting to threatened status is increasing the known total population to a minimum 1,950 territories that are geographically distributed to allow metapopulation function and which are maintained over a 5-year period. An alternative criterion (Criterion B) for downlisting the subspecies to threatened is to increase the population to a minimum of 1,500 territories that are geographically distributed among management units and recovery units, protect the habitat supporting willow flycatcher populations from threats and loss, and maintain the population for a minimum 3-year period. The criteria for delisting the southwestern willow flycatcher is achieving Criterion A, providing protection from threats and creating/securing enough habitat to ensure maintenance of the populations and habitats over time (USFWS 2002).

The recovery plan also describes actions to offset habitat impacts, mitigation efforts, and other conservation efforts undertaken to the point in time the recovery plan was published in 2002. These conservation efforts included the following:

- Annual cowbird trapping on Marine Corps Base, Camp Pendleton, beginning in 1983, and annual surveys and nest monitoring started in 1999.
- Cowbird trapping, habitat restoration, and other conservation efforts in the Prado Basin area of the Santa Ana River beginning in 1996.
- Cowbird trapping and flycatcher monitoring and research associated with the construction of Isabella Dam.
- Management activities to benefit the southwestern willow flycatcher associated with the Roosevelt Dam in Arizona, including habitat acquisition, fencing, restoration, cowbird trapping, research, and monitoring.
- Protection and management of the Audubon Kern River Preserve, California, and habitat in the Cliff-Gila Valley, New Mexico, by the Nature Conservancy.

Several habitat conservation plans that provide regulatory coverage for southwestern willow flycatcher have been implemented, including

the Clark County, Nevada, Habitat Conservation Plan; the Lower Colorado River Multi-Species Conservation Plan; the Western Riverside County Multiple Species Habitat Conservation Plan; the City and County of San Diego Multiple Species Conservation Programs; the San Diego Association of Governments North County Multiple Habitat Conservation Program; the Southern Orange County Habitat Conservation Plan; and the Sonoran Desert Multi-Species Conservation Plan. Each of these conservation plans provides for conservation/protection and management of riparian habitats that benefit southwestern willow flycatcher.

In 2005, the USFWS designated approximately 48,896 hectares (120,824 acres) of critical habitat for the southwestern willow flycatcher, including along the Mojave River in the Plan Area (70 FR 60886–61009). A proposed rule for revised critical habitat for the southwestern willow flycatcher was published in August 2011 (76 FR 50542-50629). Rather than designating aerial extent (i.e., total hectares) of critical habitat, as was done in the 2005 designation, the 2011 proposed rule expresses the total proposed critical habitat in terms of total stream length; approximately 3,364 stream kilometers (2,090 stream miles). The 2011 proposed rule designates the Mojave Management Unit, which includes a 35.7-kilometer (22.2-mile) segment of the Mojave River (which is substantially expanded downstream compared to the 2005 designation), a 11.2-kilometer (6.9-mile) segment of the West Fork Mojave River, a 19.6-kilometer (12.2-mile) segment of Holcomb Creek (outside the Plan Area), and a 20.0-kilometer (12.5-mile) segment of Deep Creek (which includes the Mojave River Forks Reservoir in the Plan Area, but most of which is outside the Plan Area). The proposed rule also designates the Amargosa Management Unit segments, which include a 12.3 kilometer (7.7 mile) segment of the Amargosa River and a 3.5-kilometer (2.2-mile) segment of Willow Creek (3.5 km, 2.2 mi) in Inyo and San Bernardino counties. Neither of these two segments is in the current 2005 critical habitat designation.

Although the current 2005 critical habitat designation (nor the 2011 proposed designation) does not require specific conservation measures, it requires that evaluations of potential impacts on critical habitat be made on projects with a federal nexus (e.g., a federal permit action or funding) and may result in protection measures to avoid

adverse modification or destruction of critical habitats associated with the project.

In 2010, the U.S. Geological Survey, in cooperation with the Bureau of Reclamation and the USFWS, developed a standardized survey protocol to be used for focused surveys throughout the range of the southwestern willow flycatcher (Sogge et al. 2010). This protocol provides information necessary to conduct and interpret survey results successfully, including a summary of basic ecological and population status information. Having a standardizing survey protocol allows for consistent data collection, reporting, and streamlined interpretation.

Restoration of breeding habitat for *E. t. adastus* and *E. t. brewsteri* has been a prime focus under the amended Sierra Nevada Forest Plan, and restoration efforts in the Owens Valley and near Mono Lake have improved breeding opportunities after original riparian nesting habitat was lost due to diversion of water to Los Angeles. All of these efforts are outside the Plan Area.

Data Characterization

At this time, information on the distribution and occurrence of the southwestern willow flycatcher within the Plan Area is limited, with very few documented occurrences. A greater level of confidence regarding the distribution of populations and isolated territories is needed in order to understand the species' local status so that it can be managed adequately. Furthermore, the loss and degradation of riparian habitat is one of the most critical threats to the southwestern willow flycatcher. More information is needed regarding the distribution of suitable and potentially suitable habitat within the Plan Area and potential impacts that may be occurring in those areas, such as occupancy by invasive species and hydrologic alterations. As recovery efforts continue and the population size increases, an important question for recovery and management is the potential for geographic expansion of the subspecies' breeding range.

Further investigation on the wintering grounds for southwestern willow flycatcher is needed in order to ensure that this subspecies is being protected adequately. Additional studies on the boundaries of

the winter range and the quality of habitat used by this subspecies need to be conducted. Once this information is available, studies regarding the factors that limit survival of southwestern willow flycatcher during the winter can be conducted. Additionally, studies regarding threats to wintering grounds can be identified, followed by identification of methods needed, if any, to protect wintering grounds. Similar studies need to be conducted for migratory corridors used by this subspecies (Finch and Stoleson 2000). The same is true for *E. t. adastus* and *E. t. brewsteri*, especially in regard to how they use the Plan Area during annual migration periods.

Management and Monitoring Considerations

The recovery plan for the southwestern willow flycatcher outlines nine types of recovery actions: (1) increase and improve currently suitable and potentially suitable habitat; (2) increase metapopulation stability; (3) improve demographic parameters; (4) minimize threats to wintering and migration habitat; (5) survey and monitor; (6) conduct research; (7) provide public education and outreach; (8) assure implementation of laws, policies, and agreements that benefit the flycatcher; and (9) track recovery progress (USFWS 2002). As noted above, the Plan Area overlaps with portions of the Lower Colorado River Recovery Unit (Western Part) and the Basin and Mojave Recovery Unit. In the portion of the Lower Colorado River Recovery Unit overlapping the Plan Area, southwestern willow flycatcher occurrences are known from several locations south of Hoover Dam to the U.S.–Mexico border. In 2007, southwestern willow flycatcher territories were reported from the Hoover–Parker management unit and the Parker–Southern International Border management unit (Durst et al. 2008a). In the portion of the Basin and Mojave Recovery Unit overlapping the Plan Area, southwestern willow flycatcher occurrences are known from the Mojave River in the Victorville area. In 2007, southwestern willow flycatcher territories were reported from the Owens Management Unit, Amargosa Management Unit, Mojave Management Unit, and the Salton Management Unit (Durst et al. 2008a).

Given the apparent limited occurrence of the southwestern willow flycatcher in the Plan Area, management for the subspecies should

focus on removing existing or potential threats to riparian habitats, including invasive species, hydrologic changes in groundwater and surface water, and runoff from agriculture and urban uses. As discussed in Threats and Environmental Stressors, even though tamarisk is an invasive species, and ideally it would be eradicated and replaced with native cottonwood and willow habitats, tamarisk currently provides important nesting habitat for southwestern willow flycatcher (e.g., Paxton et al. 2011b; Shafroth et al. 2010). A temporal loss of tamarisk without available compensatory regeneration or restoration of native riparian habitat could have a substantial adverse effect on breeding southwestern willow flycatchers (e.g., Paxton et al. 2011b). Ellis et al. (2008), for example, recommends that tamarisk-dominant habitat in Arizona occupied by southwestern willow flycatcher should not be considered.

Ongoing monitoring and surveying efforts should continue in the Plan Area along the lower Colorado River, Mojave River, and Amargosa River and Willow Creek in areas containing suitable habitat in association with range-wide monitoring.

In addition to short-term cowbird control practices, such as trapping, long-term management practices may be needed for control of cowbird populations in southwestern willow flycatcher habitat if monitoring demonstrates that cowbirds are having significant local effects on southwestern willow flycatchers. Long-term management should emphasize reducing conditions known to attract cowbirds to riparian habitats, such as anthropogenic influences including golf courses, horse stables, and agricultural fields (Finch and Stoleson 2000; USFWS 2002). Providing educational programs for people residing near breeding populations would be beneficial in order to reduce anthropogenic conditions that attract cowbirds and domestic pets that can prey on birds.

Because southwestern willow flycatcher habitat also is threatened by catastrophic wildfires, especially in areas that support tamarisk (Finch and Stoleson 2000), specific fire management plans should be prepared in coordination with local firefighters for discrete occupied habitat areas.

All of the above management considerations relative to riparian habitats would also benefit *E. t. adastus* and *E. t. brewsteri* where they migrate through the Plan Area.

Species Modeled Habitat Distribution

This section provides the results of habitat modeling for willow flycatcher, using available spatial information and occurrence information, as appropriate. For this reason, the term “modeled suitable habitat” is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 329,611 acres of modeled suitable habitat for willow flycatcher in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat in the Plan Area.

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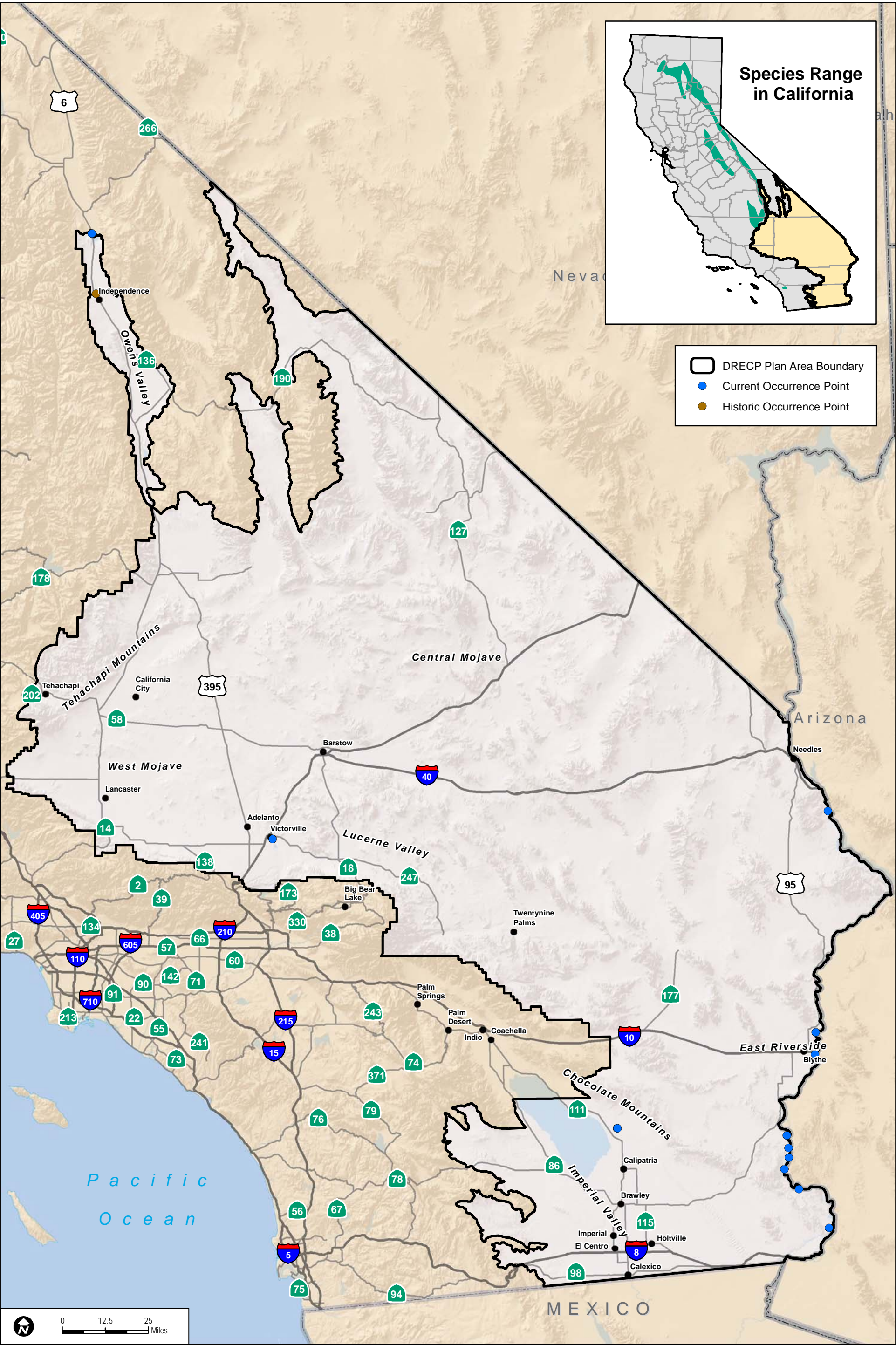
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Sources: ESRI (2014); DRECP Species Occurrence Database (2013), CWHR (2008)

FIGURE SP-B11

Southwestern Willow Flycatcher Occurrences in the Plan Area

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